

Study Area: **PG&E Kern**

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Summer Light Load	N/A	N/A	N/A	
KRN-T-1	34716 LRDO JCT 115 34718 KERN OIL 115 1	P1-1:A15:25:_MT POSO 13.80 Generator ID 1 and P1-2:A15:35:_Kern PP-Seventh Standard 115 kV Line	P3	L-1/G-1	102.95	107.03	<100	<100	<100				East Kern 115 kV Voltage Conversion Project
KRN-T-2	34724 KRN OL J 115 34798 KERNWATR 115 1	P1-1:A15:17:_DEXEL + 13.80 Generator ID 1 and P1-2:A15:44:_Kern-Live Oak 115 kV Line	P3	L-1/G-1	100.39	<100	<100	<100	<100				Short term: Action Plan Long term: Wheeler Ridge Junction Station Project/East Kern 115 kV Voltage Conversion Project
KRN-T-3	34724 KRN OL J 115 34798 KERNWATR 115 1	P1-1:A15:39:_PSE-LVOK 9.11 Generator ID 1 and P1-2:A15:44:_Kern-Live Oak 115 kV Line	P3	L-1/G-1	108.84	<100	<100	<100	<100				Short term: Action Plan Long term: Wheeler Ridge Junction Station Project/East Kern 115 kV Voltage Conversion Project
KRN-T-4	34728 LIVE OAK 115 34752 KERN PWR 115 1	P1-1:A15:39:_PSE-LVOK 9.11 Generator ID 1 and P1-2:A15:47:_Kern Oil-Witco 115 kV Line	P3	L-1/G-1	114.59	121.47	<100	<100	<100				Short term: Action Plan (summer setup). Long term: Mitigated by the approved Kern PP 115 kV Area Reinforcement Project
KRN-T-5	34752 KERN PWR 115 34798 KERNWATR 115 1	P1-1:A15:39:_PSE-LVOK 9.11 Generator ID 1 and P1-2:A15:44:_Kern-Live Oak 115 kV Line	P3	L-1/G-1	112.03	<100	<100	<100	<100				Short term: Action Plan (summer setup). Long term: Mitigated by the approved Kern PP 115 kV Area Reinforcement Project
KRN-T-6	34918 KERN PW2 70.0 34914 KERN PW1 70.0 1	P1-1:A15:11:_KERNCNYN 11.00 Generator ID 1 and P1-3:A15:25:_Kern PP 115/70 kV Transformer #2	P3	L-1/G-1	102.52	110.40	<100	<100	<100				Short term: Action Plan (summer setup). Long term: Mitigated by the approved Kern PP 115 kV Area Reinforcement Project
KRN-T-7	38605 BUENAVJ2 230 30970 MIDWAY 230 1	P1-1:A15:55:_ELKHIL2G 18.00 Generator ID 1 and P1-2:A15:89:_Midway-Wheeler Ridge #1 230 kV Line	P3	L-1/G-1	104.51	<100	<100	<100	<100				East Kern 115 kV Voltage Conversion Project
KRN-T-8	30970 MIDWAY 230 30942 STCKDLJ1 230 1	P1-2:A15:16:_Midway-Kern #3 230 kV Line and P1-2:A15:17:_Midway-Kern #4 230 kV Line	P6	N-1-1	127.89	<100	<100	<100	<100				Short term: Action Plan Long term: Mitigated by the approved Midway-Kern PP #1, #3 & #4 230 kV Line Capacity Increase Project
KRN-T-9	34704 SEMITROPIC_D 115 34705 WSCOPRSN 115 1	P1-2:A15:101:_Semitropic-Wasco 115 kV Line and P1-2:A15:28:_Kern-Kern Oil-Famoso 115 kV Line	P6	N-1-1	<100	<100	122.08	<100	<100				East Kern 115 kV Conversion Project

Study Area: **PG&E Kern**

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Summer Light Load	N/A	N/A	N/A	
KRN-T-10	34704 SEMITROPIC_D 115 34743 SEMITROPIC_E 115 1	P1-2:A15:38:_Smyrna-Semitropic-Midway 115 kV Line and P1-2:A15:28:_Kern-Kern Oil-Famoso 115 kV Line	P6	N-1-1	<100	<100	126.90	<100	<100				East Kern 115 kV Conversion Project
KRN-T-11	34705 WSCOPRSN 115 34710 CHARKA 115 1	P1-2:A15:101:_Semitropic-Wasco 115 kV Line and P1-2:A15:28:_Kern-Kern Oil-Famoso 115 kV Line	P6	N-1-1	<100	<100	112.07	<100	<100				East Kern 115 kV Conversion Project
KRN-T-12	34706 WESTPARK 115 34752 KERN PWR 115 1	P1-2:A15:34:_Kern PP-Westpark #2 115 kV Line and P1-2:A15:42:_Kern-Magunden-Witco 115 kV Line	P6	N-1-1	118.57	<100	<100	<100	<100				Short term: Action Plan (summer setup). Long term: Mitigated by the approved Kern PP 115 kV Area Reinforcement Project
KRN-T-13	34706 WESTPARK 115 34752 KERN PWR 115 2	P1-2:A15:33:_Kern PP-Westpark #1 115 kV Line and P1-2:A15:42:_Kern-Magunden-Witco 115 kV Line	P6	N-1-1	118.57	<100	<100	<100	<100				Short term: Action Plan (summer setup). Long term: Mitigated by the approved Kern PP 115 kV Area Reinforcement Project
KRN-T-14	34716 LRDO JCT 115 34718 KERN OIL 115 1	P1-2:A15:35:_Kern PP-Seventh Standard 115 kV Line and P1-1:A15:25:_MT POSO 13.80 Generator ID 1	P6	N-1-1	102.97	107.03	<100	<100	<100				East Kern 115 kV Conversion Project
KRN-T-15	34724 KRN OL J 115 34798 KERNWATR 115 1	P1-2:A15:35:_Kern PP-Seventh Standard 115 kV Line and P1-2:A15:44:_Kern-Live Oak 115 kV Line	P6	N-1-1	113.94	<100	<100	<100	<100				Short term: Action Plan (summer setup). Long term: Mitigated by the approved Kern PP 115 kV Area Reinforcement Project/ Wheeler Ridge Junction Station Project
KRN-T-16	34726 PTRL JCT 115 34719 POSOMTJT 115 1	P1-2:A15:35:_Kern PP-Seventh Standard 115 kV Line and P1-2:A15:40:_Kern Oil-Witco 115 kV Line	P6	N-1-1	114.92	122.65	<100	<100	<100				East Kern 115 kV Conversion Project
KRN-T-17	34726 PTRL JCT 115 34728 LIVE OAK 115 1	P1-2:A15:35:_Kern PP-Seventh Standard 115 kV Line and P1-2:A15:40:_Kern Oil-Witco 115 kV Line	P6	N-1-1	114.91	122.64	<100	<100	<100				East Kern 115 kV Conversion Project

Study Area: PG&E Kern

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Summer Light Load	N/A	N/A	N/A	
KRN-T-18	34728 LIVE OAK 115 34752 KERN PWR 115 1	P1-2:A15:42:_Kern PP-Seventh Standard 115 kV Line and P1-2:A15:47:_Kern Oil-Witco 115 kV Line	P6	N-1-1	132.24	144.91	<100	<100	<100				Short term: Action Plan (summer setup). Long term: Mitigated by the approved Kern PP 115 kV Area Reinforcement Project/East Kern 115 kV Voltage Conversion Project
KRN-T-19	34752 KERN PWR 115 30945 KERN PP 230 3	P1-3:A15:22:_Kern PP 230/115 kV Transformer #5 and P1-3:A15:21:_Kern PP 230/115 kV Transformer #4	P6	N-1-1	177.72	139.31	136.19	<100	<100				Replace terminal limiting equipment to benefit from the full 420MVA transformer rating as part of the Kern PP 230kV Area Reinforcement Project.
KRN-T-20	34752 KERN PWR 115 30945 KERN PP 230 4	P1-3:A15:20:_Kern PP 230/115 kV Transformer #3 and P1-3:A15:22:_Kern PP 230/115 kV Transformer #5	P6	N-1-1	145.87	106.21	104.07	<100	<100				Short term: Action Plan (Install SPS as part of the approved Kern PP 230 kV Area Reinforcement Project) Long term: Kern PP 230 kV Area Reinforcement Project
KRN-T-21	34752 KERN PWR 115 30945 KERN PP 230 5	P1-3:A15:21:_Kern PP 230/115 kV Transformer #3 and P1-3:A15:22:_Kern PP 230/115 kV Transformer #4	P6	N-1-1	127.23	100.28	<100	<100	<100				TBD/East Kern 115 kV Conversion Project
KRN-T-22	34752 KERN PWR 115 34798 KERNWATR 115 1	P1-2:A15:35:_Kern PP-Seventh Standard 115 kV Line and P1-2:A15:44:_Kern-Live Oak 115 kV Line	P6	N-1-1	117.02	<100	<100	<100	<100				Short term: Action Plan (summer setup). Long term: Mitigated by the approved Kern PP 115 kV Area Reinforcement Project
KRN-T-23	34752 KERN PWR 115 34798 KERNWATR 115 1	P1-2:A15:39:_Westpark-Magunden 115 kV Line and P1-2:A15:53:_Magunden-Wheeler Ridge Jct 115 kV Line	P6	N-1-1	<100	102.47		<100	<100				Short term: Action Plan (summer setup). Long term: Mitigated by the approved Kern PP 115 kV Area Reinforcement Project
KRN-T-24	34860 TAFT A 70.0 34919 TX_BV_HL 70.0 1	P1-2:A15:72:_Midway-Taft 115 kV Line and P1-2:A15:73:_Taft-Chalk Cliff 115 kV Line	P6	N-1-1	<100	<100	101.17	<100	<100				Short term: Action Plan Long term: Wheeler Ridge Junction Station Project
KRN-T-25	34872 LAKEVIEW 70.0 34882 SAN EMDO 70.0 1	P1-3:A15:18:_Wheeler Ridge 230/70 kV Transformer #4 and P1-3:A15:19:_Wheeler Ridge 230/70 kV Transformer #5	P6	N-1-1	<100	<100	<100	118.76	Diverged				Short term: Action Plan Long term: Wheeler Ridge Junction Station Project
KRN-T-26	34904 OLD RIVR 70.0 34975 OLD_RVR1_TP 70.0 1	P1-3:A15:25:_Kern PP 115/70 kV Transformer #2 and P1-2:A15:96:_Kern PP 70 kV Bus Tie Breaker	P6	N-1-1	Diverged	Diverged	<100	<100	<100				Short term: Action Plan Long term: Wheeler Ridge Junction Station Project

Study Area: **PG&E Kern**

Thermal Overloads



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)								Potential Mitigation Solutions
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Summer Light Load	N/A	N/A	N/A	
KRN-T-27	34918 KERN PW2 70.0 34914 KERN PW1 70.0 1	P1-3:A15:24: _Kern PP 115/70 kV Transformer #1 and P1-2:A15:28: _Kern-Old River #2 (Kern-Panama) 70 kV Line	P6	N-1-1	117.78	129.41	140.51	<100	<100				Short term: Action Plan (summer setup). Long term: Mitigated by the approved Kern PP 115 kV Area Reinforcement Project
KRN-T-28	34926 FAMOSO 70.0 34131 CAWLOB T 70.0 1	P1-2:A15:14: _Midway-LaPaloma #1 230 kV Line and P1-2:A15:29: _Smyrna-Semitropic-Midway 115 kV Line	P6	N-1-1	<100	<100	<100	100.07	<100				East Kern 115 kV Conversion Project
KRN-T-29	34975 OLD_RVR1_TP 70.0 34903 PANMJCT1 70.0 1	P1-3:A15:25: _Kern PP 115/70 kV Transformer #2 and P1-2:A15:85: _Kern PP 70 kV Bus Tie Breaker	P6	N-1-1	Diverged	NConv	<100	<100	<100				Short term: Action Plan Long term: Mitigated by the approved Midway-Kern PP #1, #3 & #4 230 kV Line Capacity Increase Project
KRN-T-30	38605 BUENAVJ2 230 30970 MIDWAY 230 1	P1-2:A15:26: _Kern-Kern Front (PSE) 115 kV Line and P1-2:A15:89: _Midway-Wheeler Ridge #1 230 kV Line	P6	N-1-1	104.26	<100	<100	<100	<100				Short term: Action Plan Long term: Mitigated by the approved Midway-Kern PP #1, #3 & #4 230 kV Line Capacity Increase Project
KRN-T-31	38605 BUENAVJ2 230 30970 MIDWAY 230 1	P1-2:A15:26: _Wheeler Ridge Jct-Wheeler Ridge 230 kV Line and P1-2:A15:101: _Midway-Wheeler Ridge #1 230 kV Line	P6	N-1-1	<100	102.32	102.93	<100	<100				Short term: Action Plan Long term: Mitigated by the approved Midway-Kern PP #1, #3 & #4 230 kV Line Capacity Increase Project

Study Area: **PG&E Kern**

Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %								Potential Mitigation Solutions
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Summer Light Load	N/A	N/A	N/A	

No voltage deviations identified.

Study Area: **PG&E Kern**

High/Low Voltage



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)							Potential Mitigation Solutions	
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Summer Light Load	N/A	N/A		N/A
KRN-V-1	COPUS_D 70 kV	P1-1:A15:60:_S_KERN 0.36 Generator ID 1 and P1-2:A15:97:_Kern-Old River #1 70 kV Line	P3	L-1/G-1	>0.9	>0.9	0.8914	>0.9	>0.9				Monitor voltage
KRN-V-2	COPUS_E 70 kV	P1-1:A15:60:_S_KERN 0.36 Generator ID 1 and P1-2:A15:97:_Kern-Old River #1 70 kV Line	P3	L-1/G-1	>0.9	>0.9	0.8914	>0.9	>0.9				Monitor voltage
KRN-V-3	WHEELER 230 kV	P1-1:A15:58:_ORION 0.44 Generator ID 1 and P1-2:A15:89:_Midway-Wheeler Ridge #1 230 kV Line	P3	L-1/G-1	0.8913	>0.9	>0.9	>0.9	>0.9				Action Plan
KRN-V-4	BAKRSFLD 70 kV	P1-3:A15:24:_Kern PP 115/70 kV Transformer #1 and P1-2:A15:85:_Kern PP 70 kV Bus Tie Breaker	P6	N-1-1	>0.9	>0.9	0.8553	1.1022	>0.9				Mitigation under investigation
KRN-V-5	CARNATIO 70 kV	P1-2:A15:100:_Kern PP 70 kV Bus Tie Breaker and P1-3:A15:24:_Kern PP 115/70 kV Transformer #2	P6	N-1-1	>0.9	>0.9	0.8627	>0.9	>0.9				Monitor voltage
KRN-V-6	COPUS_D 70 kV	P1-2:A15:82:_Kern-Old River #1 70 kV Line and P1-3:A15:33:_South Kern Solar 70/34.5 kv GSU	P6	N-1-1	0.8601	0.842	0.8375	>0.9	>0.9				Action Plan
KRN-V-7	EISEN 70 kV	P1-2:A15:100:_Kern PP 70 kV Bus Tie Breaker and P1-3:A15:24:_Kern PP 115/70 kV Transformer #2	P6	N-1-1	>0.9	>0.9	0.8444	>0.9	>0.9				Monitor voltage
KRN-V-8	GRMWY_SM 70 kV	P1-2:A15:100:_Kern PP 70 kV Bus Tie Breaker and P1-3:A15:24:_Kern PP 115/70 kV Transformer #2	P6	N-1-1	>0.9	>0.9	0.8098	>0.9	>0.9				Monitor voltage
KRN-V-9	KERN PW2 70 kV	P1-2:A15:85:_Kern PP 70 kV Bus Tie Breaker and P1-3:A15:24:_Kern PP 115/70 kV Transformer #1	P6	N-1-1	>0.9	1.1038	1.1001	1.1089	>0.9				Mitigation under investigation
KRN-V-10	KERN PW2 70 kV	P1-2:A15:100:_Kern PP 70 kV Bus Tie Breaker and P1-3:A15:24:_Kern PP 115/70 kV Transformer #2	P6	N-1-1	>0.9	>0.9	0.8614	>0.9	>0.9				Monitor voltage
KRN-V-11	KRN CNYN 70 kV	P1-2:A15:100:_Kern PP 70 kV Bus Tie Breaker and P1-3:A15:24:_Kern PP 115/70 kV Transformer #2	P6	N-1-1	>0.9	>0.9	0.8645	>0.9	>0.9				Monitor voltage
KRN-V-12	MAGUNDEN 70 kV	P1-2:A15:100:_Kern PP 70 kV Bus Tie Breaker and P1-3:A15:24:_Kern PP 115/70 kV Transformer #2	P6	N-1-1	>0.9	>0.9	0.8567	>0.9	>0.9				Monitor voltage
KRN-V-13	OLD RIVR 70 kV	P1-3:A15:33:_South Kern Solar 70/34.5 kv GSU and P1-2:A15:97:_Kern-Old River #1 70 kV Line	P6	N-1-1	>0.9	0.8984	0.8954	>0.9	>0.9				Monitor voltage
KRN-V-14	PANAMA 70 kV	P1-2:A15:100:_Kern PP 70 kV Bus Tie Breaker and P1-3:A15:24:_Kern PP 115/70 kV Transformer #2	P6	N-1-1	>0.9	>0.9	0.8713	>0.9	>0.9				Monitor voltage
KRN-V-15	RIOBRVQF 70 kV	P1-2:A15:100:_Kern PP 70 kV Bus Tie Breaker and P1-3:A15:24:_Kern PP 115/70 kV Transformer #2	P6	N-1-1	>0.9	>0.9	0.8621	>0.9	>0.9				Monitor voltage

Study Area: **PG&E Kern**

High/Low Voltage



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)								Potential Mitigation Solutions
					2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Summer Light Load	N/A	N/A	N/A	
KRN-V-16	SEMITRPC 70 kV	P1-3:A15:25:_Kern PP 115/70 kV Transformer #2 and P1-2:A15:29:_Smyrna-Semitropic-Midway 115 kV Line	P6	N-1-1	>0.9	>0.9	>0.90	0.90	>0.9				Action Plan
KRN-V-17	WEEDPATCH_SF 70 kV	P1-2:A15:100:_Kern PP 70 kV Bus Tie Breaker and P1-3:A15:24:_Kern PP 115/70 kV Transformer #2	P6	N-1-1	>0.9	>0.9	0.83	>0.9	>0.9				Monitor voltage
KRN-V-18	WELLFILD 70 kV	P1-2:A15:100:_Kern PP 70 kV Bus Tie Breaker and P1-3:A15:24:_Kern PP 115/70 kV Transformer #2	P6	N-1-1	>0.9	>0.9	0.81	>0.9	>0.9				Monitor voltage
KRN-V-19	WHEELER 230 kV	P1-2:A15:26:_Wheeler Ridge Jct-Wheeler Ridge 230 kV Line and P1-2:A15:102:_Midway-Wheeler Ridge #2 230 kV Line	P6	N-1-1	>0.9	1.1415	1.13	>0.9	>0.9				Mitigation under investigation
KRN-V-20	WHEELER 230 kV	P1-2:A15:89:_Midway-Wheeler Ridge #1 230 kV Line and P1-3:A15:18:_Wheeler Ridge 230/70 kV Transformer #4	P6	N-1-1	0.89	>0.9	>0.9	>0.9	>0.9				Action Plan
KRN-V-21	WHEELER 230 kV	P1-2:A15:89:_Midway-Wheeler Ridge #1 230 kV Line and P1-2:A15:90:_Midway-Wheeler Ridge #2 230 kV Line	P6	N-1-1	>0.9	>0.9	>0.9	0.84	>0.9				Action Plan

Study Area: **PG&E Kern**

Transient Stability



ID	Contingency	Category	Category Description	Transient Stability Performance								Potential Mitigation Solutions
				2017 Summer Peak	2020 Summer Peak	2025 Summer Peak	2017 Spring Off-Peak	2020 Summer Light Load	N/A	N/A	N/A	
X-TS-1												

Study Area: PG&E Kern



Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)								Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SLD-1												

No single contingency resulted in total load drop of more than 250 MW.

Study Area: **PG&E Kern**



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)								Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
X-SS-1										

No single source substation with more than 100 MW Load